ON COLLECTING AND PRESERVING FISHES

By G. A. Boulenger

It is often believed that the fishes of British East Africa are comparatively well known, and considering the trouble incurred in preserving and transporting specimens in spirit, many travellers neglect this group of Zoology and turn their attention to others more likely, in their opinion, to yield interesting results. Nothing, however, could be more erroneous, as among the collections that have been made in East Africa within the last decade, fishes have invariably proved of great interest. There is no doubt that they are more imperfectly known than reptiles or batrachians.

It has been my privilege to describe something like seventy new species of fishes from within the limits of British East Africa, yet, a few months ago, quite a small collection made by Mr. Blayney Percival has added two to the list. It is especially among such small Silurids (cat-fish) and Cyprinids (barbels and other carp-like fishes) that live in mountain streams that important discoveries are likely to be made.

Difficulties of preservation and transport constitute the usual objection to making such collections, but if travellers would bear in mind that even small specimens, from one to six inches in length, which may be easily preserved in small jars or corked tubes, are likely to prove valuable, knowledge would be rapidly increased.

Spirit, pure or methylated alcohol if possible, is the only preserving fluid to be recommended. Collectors have, unfortunately, too often been advised to use formol (formalin of commerce, a 40 per cent. solution of formaldehyde). The objection to formol for preserving fishes is that the tissues are stiffened to such an extent, even if a weak solution (5 per cent. of formalin) be used, as to render the manipulations necessary for description or study very difficult: in counting fin-rays and in examining the teeth and gill-arches, the fins and parts of the head break and specimens which seemed at first excellently preserved are soon damaged, which is all the more

regrettable in the case of the types on which new species are founded.

For the use of those who might feel disposed to collect fishes on a larger scale, the following instructions have been drawn up.

All fishes not over two feet in length and, when feasible, larger ones also should be preserved in alcohol. Methylated spirit (64 degrees over proof) may be used, but should be diluted with filtered water to reduce its strength according to the nature of the specimens preserved (the strength to be tested by means of the hydrometer or alcoholmeter). Fishes with naked skin, such as eels and cat-fish, must, in the first instance, be placed in spirit not above 10 degrees over proof (35 to 40 per cent. of water), to be transferred after a few hours to 20 or 25 degrees (30 per cent. water). Ordinary scaly fishes must be thrown at once into spirit 40 degrees over proof (20 per cent. water), the spirit to be changed after a day or two, and a second time if required. Specimens showing signs of putrefaction before being placed in spirits should be rejected, unless utilised as skeletons.

In order to accelerate the penetration of the spirit a small incision should be made with a scalpel or sharp pair of scissors along the mid-ventral line of the fish; through this opening, as well as through the pharynx, strong spirit should be injected with a syringe.

It must be borne in mind that in large and fleshy fishes the spirit penetrates very slowly, and in order to prevent decomposition of the inner layers of muscle, a few deep incisions in the muscular part of the body may be necessary; these, if neatly made, will not seriously damage the specimen. During the first period of immersion it is desirable occasionally to turn over the specimens and to press them between the fingers, so as to expel the blood and mucosities; the viscera should not be removed or injured as they are often required for study.

Not until the fishes are thoroughly impregnated with spirit and free from all signs of decay should they be packed for transmission. This is best done by placing them close together in a tin or jar, separated by layers of *unstained* tissue-paper or rags, and filling the receptacle with strong alcohol. Every

specimen should bear a small numbered parchment label tied round the tail or base of the pectoral fin, and referring to a list in which all information should be carefully noted. In view of the possibility of the label becoming detached and lost, a duplicate may be inserted under the left gill-cover.

In the list or pocket-book should be recorded—the exact locality, the date, and the manner in which the specimen was obtained, the native name if known, some notes on the coloration, the shape of the pupil of the eye, and any other information that may be procured. Coloured sketches of the specimens would be valuable, but drawings, the originals of which have not been preserved, are useless.

Large specimens should, of course, be placed in the collecting boxes such as are provided by the British Museum, but these boxes may be usefully supplemented by cases made of zinc plates cut to the proper size and put together when required by the collector himself with a soldering apparatus. These cases could be sent home, if necessary, protected by wooden outside boxes. Small and delicate specimens should not go into the collecting boxes, but are better preserved in jars with screw stoppers or ordinary pickle-jars closed with bladder; the bladders must be allowed to dry well on the stoppers before packing. Sealing wax, which melts when in contact with alcohol, should never be used.

Fishes over 2 feet can be preserved as skins or as skeletons. The skull and gill-arches must be left in the skin, the fish being cut open along the abdominal line from the throat to the base of the ventral fins, then on one side above the anal fin to the root of the caudal. The bones supporting the fins are cut through, all the bones and flesh are removed and the inside of the skin is cleaned. The fish is then filled with flax or cotton wool and dried. The fin-rays need not be spread out in the process of drying; they are best laid down against the body, so as to avoid the risk of their being torn or broken in transit.

Skeletons need only be roughly cleaned, care being taken not to remove any of the bones and fin-rays, and dried in the sun. The muscles supported by the delicate bones above the ribs should not be removed, but merely thinned down as much as possible.